REMARKS

The subject invention relates to focusing optics for small spot metrology. Two embodiments are disclosed. The first embodiment is illustrated in Figure 4 and covers a system with a concave spherical mirror and a convex spherical mirror arranged in a mutually non-obscuring configuration. In addition, both mirrors are fabricated as off-axis sections and positioned in a substantially monocentric manner. The first embodiment provides for non-normal incidence illumination and/or collection of light.

The second embodiment, illustrated in Figure 6, is configured for normal incidence illumination and/or collection. The objective includes a concave off-axis paraboloid mirror and a flat mirror. Both the mirrors are positioned to be mutually non-obscuring.

In the Office Action, the Examiner rejected claim 7 under 35 USC 101. Claim 7 has been cancelled. In addition, claims 9, 11, 12, 13 and 16 to 20 have been cancelled to expedite prosecution.

In the Office Action, the Examiner rejected 1 and 3 based on the patent to Norton (6,778,273) in view of Shafer (4,205,902). Claims 1 and 3 are directed to the Figure 4 embodiment. The Examiner also indicated the claims 17 and 18 contained allowable subject matter. Accordingly, applicant has amended claims 1 and 3 with the subject matter of claims 17 and 18 respectively. It is believed that claims 1 and 3 are now in condition for allowance.

Claims 5 and 6 were rejected based on the patent to Doyle (Re 32,912) either alone or in combination with Stumbo (6,310,687) or Wurz (5,661,561). Independent claims 5 and 6 are directed to the Figure 6 embodiment. Claims 5 and 6 have been amended to include an aperture stop located close to the flat mirror. As noted in the specification, this places the aperture at or near the pupil plane. By this arrangement, the system can map intensity variations over the spread of angles of incidence in the sample plane 602 into intensity variations across aperture 610.

The Doyle patent relates to a focusing apparatus for spectroscopy. The optics of Figure 2, referred to by the Examiner, would be used to collect light from the transept interferometer 22 of Figure 1 and direct it to detector 56. Doyle does not disclose the use of an aperture near the plane mirror 78.

The patent to Stumbo discloses a light tracking device which employs a parabolic mirror for focusing light onto the sample and collecting light reflected from the sample. The Examiner

notes that the beam splitter 126 in Figure 2 is a "plane mirror of a sort." The Examiner also notes that Figure 5B shows an aperture in front of the detector. First, it should be noted that Figure 5B does not include a plane mirror so that it is different from the Figure 2 arrangement. More importantly, the aperture of Figure 5B is located directly in front of the detector and is conjugate to the sample and therefore will not resolve intensity information as a function of angle of incidence on the sample. As noted above, claims 5 and 6 have been amended to position the aperture near the flat mirror which allows the system to map intensity variations over the spread of angles of incidence in the sample plane into intensity variations across aperture.

The patent to Wurz is even less relevant. First, it should be noted that the light between the parabolic mirror and the sample is collimated, rather than focused. Second, the light between the mirror and the "flat" (facets of scanner 22) is focused not collimated. Third, the Examiner simply states that the camera 30 would have an aperture. However, a camera aperture is merely provided to adjust camera light levels and exposure time. Such an aperture would be spaced from the scanner facets and would not function to allow the system to map intensity variations over the spread of angles of incidence in the sample plane into intensity variations across aperture.

For the reasons set forth above, it is respectfully submitted that amended claims 5 and 6 define patentable subject and allowance thereof is respectfully requested.

Respectfully submitted,

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